



Model Curriculum

Fitter Maintenance: Ferro Alloys

SECTOR: IRON & STEEL
SUB-SECTOR: FERRO ALLOYS

OCCUPATION: FITTER
REF ID: ISC/Q5501
NSQF LEVEL: 3



  

Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the
INDIAN IRON AND STEEL SECTOR SKILL COUNCIL
for the
MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: 'Fitter Maintenance: Ferro QP No. 'ISC/Q5501 NSQF Level 3'
Alloys'

Date of issuance: **December 22nd, 2015**
Valid up to: **December 21st, 2016**

** Valid up to the next review date of the Qualification Pack*


Authorised Signatory
(Indian Iron and Steel Sector Skill Council)



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Fitter Maintenance: Ferro Alloys

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Fitter Maintenance: Ferro Alloys”, in the “Iron & Steel” Sector/Industry and aims at building the following key competencies amongst the learner.

Program Name	Fitter Maintenance: Ferro Alloys		
Qualification Pack Name & Reference ID.	Fitter Maintenance: Ferro Alloys ISC/Q5501		
Version No.	1.0	Version Update Date	01-04-2017
Pre-requisites to Training	Minimum qualification – 10th Pass		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Understand the assigned job of fitter maintenance • Prepare for maintenance operation • Carry out the maintenance operation • Activities specific to insulation function • Activities specific to functions of hydraulic systems • Activities specific to functions of water cooling Systems • Use basic health and safety practices at the work place • Works effectively with others 		

This course encompasses 8 out of 8 National Occupational Standards (NOS) of “Fitter Maintenance: Ferro Alloys” Qualification Pack issued by “Indian Iron & Steel Sector Skill Council”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	Over view of Iron & Steel Industry Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 00:00	<ul style="list-style-type: none"> • Understanding Iron & steel industry • Understanding types of Iron & Steel Industry • Understanding products of Iron & Steel industry • Activities in Iron & Steel Industry 	PPTs of Iron and steel manufacturing, Charts showing the same
2	Occupational, Health and Safety (OHAS) Theory Duration (hh:mm) 08:00	<ul style="list-style-type: none"> • Understanding the Occupational health & Safety • Understand What is hazard • Documentation for Health and safety • Working at Heights, confined spaces • Remedies for fire at work place 	PPTs for OHAS related to Job Role, Display Material for PPEs related to Job Role, Safety Material



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 06:00 Corresponding NOS Code ISC/N0008		
3	5S & House keeping Theory Duration (hh:mm) 06:00 Practical Duration (hh:mm) 06:00 Corresponding NOS Code ISC/N0008	<ul style="list-style-type: none"> • Identification of bottlenecks in functioning of work place • Various methods of housekeeping both pre-work & post-work as well 	PPTs of 5S, Display Charts of 5S, Audit Checklists of 5S
4	Understand the assigned job of fitter maintenance Theory Duration (hh:mm) 12:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code ISC/N5501	<ul style="list-style-type: none"> • Understand the assigned job in accordance with the instructions / checklist • Understand the engineering drawings / manuals • Seek clarifications with respect to the equipment, drawings, if any • Identify the tools and tackles that are required to carry out the assigned job 	PPTs for various types of drawings, Blue prints and respective machines Hand tools and machines, various measuring instruments
5	Prepare for maintenance operation Duration (hh:mm) 12:00 Practical Duration (hh:mm) 30:00 Corresponding NOS Code ISC/N5502	<ul style="list-style-type: none"> • Reach the site and inspect the equipment to identify cause of problem • Prepare equipment and material for assembly after maintenance 	Hand tools and machines, various measuring instruments
6	Carry out the maintenance operation Duration (hh:mm) 12:00	<ul style="list-style-type: none"> • Conduct routine maintenance or rectify the problem, as appropriate • Conduct tests to ensure fitness • Communicate to supervisor about completion of work 	Hand tools and machines, various measuring instruments



Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Practical Duration (hh:mm) 30:00 Corresponding NOS Code ISC/N5503		
7	Activities specific to insulation function Duration (hh:mm) 12:00 Practical Duration (hh:mm) 48:00 Corresponding NOS Code ISC/N5504	<ul style="list-style-type: none"> Isolate the unit, clearing the material from pipeline and ensuring safe working condition with shutdown Carry out re-insulation activity Provide clearance for reactivation of line after due curing time 	Hand tools and machines, various measuring instruments
8	Activities specific to hydraulic functions of systems Duration (hh:mm) 12:00 Practical Duration (hh:mm) 48:00 Corresponding NOS Code ISC/N5505	<ul style="list-style-type: none"> Isolate the unit, clearing the material from pipeline and ensuring safe working condition with shutdown Arrest leakages and ensure dust free environment Provide clearance for reactivation of line after due trial operation 	Hand tools and machines, various measuring instruments
9	Activities specific to functions of water cooling systems Duration (hh:mm) 12:00 Practical Duration (hh:mm) 48:00 Corresponding NOS Code ISC/N5506	<ul style="list-style-type: none"> Isolate the unit, clearing the material from pipeline and ensuring safe working with shutdown Carry out maintenance activities Provide clearance for reactivation of line after due curing time 	Hand tools and machines, various measuring instruments
10	Use basic health and safety practices at the workplace Duration (hh:mm)	<ul style="list-style-type: none"> Health and safety procedures Fire safety procedures Emergencies, rescue and first aid procedures 	PPE, Different Type of Safety Sign, First Aid Box, Safety instrument and clothing, Step Ladder, Sample

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	04:00 Practical Duration (hh:mm) 08:00 Corresponding NOS Code ISC/N0008		Accident reports, Fire Extinguishers, Items required for fire extinguisher and fire Safety
11	Work effectively with others Duration (hh:mm) 06:00 Practical Duration (hh:mm) 06:00 Corresponding NOS Code ISC/N0009	<ul style="list-style-type: none"> Ensure appropriate communication with superiors, peers and others as applicable at work place Demonstrate appropriate behaviour and etiquette at work place 	Communication skills PPTs, Posters Team management posters
	Total Duration Theory Duration 100:00 Practical Duration 260:00	Unique Equipment Required: <ul style="list-style-type: none"> Mechanical Drawings, Blueprints, Basic Tools and Equipment's, measuring tools& precision measurement tools, Assembling tools Lubricant and coolant Material and Equipment for cleaning, lifting machines PPE, Safety Sign, First Aid Box, Fire Extinguishers 	

Grand Total Course Duration: **360Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Indian Iron and Steel Sector Skills Council](#))



Trainer Prerequisites for Job role: “Fitter Maintenance: Ferro Alloys” mapped to Qualification Pack: “ISC/Q5501”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “ISC/Q5501”.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	Min. ITI pass and preferably CTI/ATI cleared/ Diploma Mechanical
4a	Domain Certification	Certified for Job Role: “Fitter Maintenance: Ferro Alloys” mapped to QP: “ISC/Q0702”. Minimum accepted score is 80%
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “SSC/1402”. Minimum accepted score is 80%
5	Experience	Min. 5 years industry experience and minimum 2 years’ experience as Trained or un trained for same Job Role/ Trade



Annexure: Assessment Criteria

Assessment Criteria	
Job Role	Fitter Maintenance: Ferro Alloys
Qualification Pack	ISC/Q5501
Sector Skill Council	Indian Iron & Steel Sector Skill Council

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on these criteria.
5	To pass the Qualification Pack, every trainee should score a minimum of 60% in every NOS.
6	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
ISC/N5501: Understand the assigned job of fitter maintenance	PC1. Interpret the checklist and understand the job requirements	150	10	5	5
	PC2. Make a work plan to carry out the job		10	5	5
	PC3. Estimate approximate time for completion of the job		10	5	5
	PC4. Understand scale of measurement used in the drawing		10	5	5
	PC5. Understand the symbols used in the drawings		10	5	5
	PC6. Understand assembly blueprints, engineering drawings and other specifications to identify the sequence of activities required to assemble the machine		15	5	10



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC7. Read and interpret engineering drawings to ensure correct limits, tolerance and fits of equipment components		15	5	10
	PC8. Ensure / Isolate power supply		10	5	5
	PC9. Identify the areas he/she is not comfortable with before starting the job		10	5	5
	PC10. Recognize whom to contact for clarifications on the engineering design		10	5	5
	PC11. Escalate the concern to the supervisor or shift-in-charge, if needed		5	0	5
	PC12. Identify tools, tackles & equipments required to perform the operation e.g. Vernier, Micrometer, dial gauge, filler gauge, torque wrench etc.		10	5	5
	PC13. Asks helper to carry tools required to the desired work site		5	0	5
	PC14. Report to stores in case of non-availability of tools & tackles or stock-out		10	5	5
	PC 15. Ensure spares availability		10	5	5
	NOS Total Marks	Total	150	65	85
ISC/N5502: Prepare for maintenance operation	PC1. PC1. Reach the site with desired tools, tackles and equipment	100	5	0	5
	PC2. Obtain written clearance from the owner of the equipment who operates		6	5	1
	PC3. Shutoff the power before the job starts		9	5	4



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC4. By root cause analysis, identifies the part of the machine that is giving the trouble, as required		15	5	10
	PC5. By visual inspection, ensures that the parts to be assembled are not defective or rusted, in case of new assembly		15	5	10
	PC6. Ensure that tools match the desired specifications		10	5	5
	PC7. Ensure tools and equipment required for assembly are free from physical damage and ready for operation		10	5	5
	PC8. Report damaged / defective components of equipment as per the escalation Matrix		10	5	5
	PC 9. Ensure spares that are likely to be used in good condition (shelf life)		10	5	5
	PC10. Ensure the calibration status of all measuring equipment and instruments		10	5	5
	NOS Total Marks	Total	100	45	55
ISC/N5503: Carry out the maintenance operation	PC1. Dismantle the equipment, as needed	200	10	5	5
	PC2. Correct the defect in the part or replace the defective part		20	5	15
	PC3. Assemble the parts according to the drawings, as required		20	5	15
	PC4. Fasten mechanical components/ subassemblies together using screws, bolts, and collars using hand/ power tools		15	5	10
	PC5. Set and adjust linkages, tensions and clearances of assembled components to		20	5	15



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	specifications using fixed gauges and hand tools				
	PC6. Re-assemble the parts post correcting the defect		25	5	20
	PC7. Ensure alignment of parts and with the engineering drawings		20	5	15
	PC8. Check vibrations to ensure fitness		20	5	15
	PC9. Test the machine to ensure it is fit to use before handover		20	5	15
	PC10. Record the test results in the prescribed format of the organization		10	5	5
	PC11. Ensure all activities are complete according to checklist		10	5	5
	PC12. Communicate to supervisor on completion of given job in case of any deviations from checklist		10	5	5
	NOS Total Marks	Total	200	60	140
ISC/N5504: Activities specific to insulation function	PC1. Carry out the detailed procedure for isolating and clearing the unit	100	10	5	5
	PC2. Ensure proper shutdown process		10	5	5
	PC3. Report to the supervisor in case of any problem that has to be escalated		5	0	5
	PC4. Understand the need for insulation activity and give instructions for clearance of unit		10	5	5
	PC5. Dismantle the equipment and carry out insulation activity where ever required in SAF		10	5	5
	PC6. Rectify any defects in the equipment		10	5	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC7. Carry out re insulation before the equipment can be used again		10	5	5
	PC8. Report to the supervisor in case of any problem that has to be escalated		5	0	5
	PC9. Charge the line after completing re insulation		10	5	5
	PC10. Give clearance for reactivation so as to activity can be resumed		10	5	5
	PC11. Carry out damage control in case of any emergencies		10	5	5
	NOS Total Marks	Total	100	45	55
ISC/N5505: Activities specific to hydraulic functions of systems	PC1. Carry out the detailed procedure for isolating and clearing the unit	200	10	5	5
	PC2. Ensure proper shutdown process		10	5	5
	PC3. Report to the supervisor in case of any problem that has to be escalated		5	0	5
	PC4. Understand the sequence of operations involved in the system		10	5	5
	PC5. Identify the points of leakages at valves / pipe joints / seals / cylinders etc.		10	5	5
	PC6. Rectify any defects in the equipment or replace with spares		5	0	5
	PC7. Carry out trial run after ensuring the oil levels		5	0	5
	PC8. Report to the supervisor in case of any problem that has to be escalated		5	0	5
	PC9. Ensure power pack room is clean and well maintained & dust free		10	5	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC10. Switch on the line after completing		10	5	5
	PC11. Give clearance for reactivation so as to activity can be resumed		10	5	5
	PC12. Carry out damage control in case of any emergencies		10	5	5
	NOS Total Marks	Total	100	40	60
ISC/N5506: Activities specific to functions of water cooling systems	PC1. Carry out the detailed procedure for isolating and clearing the unit	100	5	0	5
	PC2. Ensure proper shutdown process and put the spare circuit in operation		10	5	5
	PC3. Report to the supervisor in case of any problem that has to be escalated		5	0	5
	PC4. Understand the water circulating system both hot water & cold water circuits		10	5	5
	PC5. Dismantle the equipment and carry out maintenance where ever required in the circuit		10	5	5
	PC6. Rectify any defects in the equipment		10	5	5
	PC7. Carry out trial runs before the equipment can be used again		10	5	5
	PC8. Report to the supervisor in case of any problem that has to be escalated		10	5	5
	PC9. Charge the line after completing maintenance		10	5	5
	PC10. Give clearance for reactivation so as the activity can be resumed		10	5	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC11. Carry out damage control in case of any emergencies		10	5	5
	NOS Total Marks	Total	100	45	55
ISC/N0008: Use basic health and safety practices at the workplace	PC1. Use protective clothing/equipment for specific tasks and work conditions	150	10	5	5
	PC2. State the name and location of people responsible for health and safety in the workplace		5	0	5
	PC3. State the names and location of documents that refer to health and safety in the workplace		1	0	1
	PC4. Identify job-site hazardous work and state possible causes of risk or accident in the workplace		9	5	4
	PC5. Carry out safe working practices while dealing with hazards to ensure the safety of self and others state methods of accident prevention in the work environment of the job role		10	5	5
	PC6. State location of general health and safety equipment in the workplace		5	0	5
	PC7. Inspect for faults, set up and safely use steps and ladders in general use		5	0	5
	PC8. Work safely in and around trenches, elevated places and confined areas		5	0	5
	PC9. Lift heavy objects safely using correct procedures		5	0	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC10. Apply good housekeeping practices at all times		1	0	1
	PC11. Identify common hazard signs displayed in various areas		6	5	1
	PC12. Retrieve and/or point out documents that refer to health and safety in the workplace		4	0	4
	PC13. Use the various appropriate fire extinguishers on different types of fires correctly		9	5	4
	PC14. Demonstrate rescue techniques applied during fire hazard		10	5	5
	PC15. Demonstrate good housekeeping in order to prevent fire hazards		1	0	1
	PC16. Demonstrate the correct use of a fire extinguisher		4	0	4
	PC17. Demonstrate how to free a person from electrocution		5	0	5
	PC18. Administer appropriate first aid to victims as required e.g. in case of bleeding, burns, choking, electric shock, poisoning etc.		10	5	5
	PC19. Demonstrate basic techniques of bandaging		5	0	5
	PC20. Respond promptly and appropriately to an accident situation or medical emergency in real or simulated environments		10	5	5
	PC21. Perform and organize loss minimization or rescue activity during an accident in real or simulated environments		5	0	5



Assessment outcome (nos)	Assessment criteria	Total marks	Marks allocation		
			Out of	Theory	Skills practical
	PC22. Administer first aid to victims in case of a heart attack or cardiac arrest due to electric shock, before the arrival of emergency services in real or simulated cases		5	0	5
	PC23. Demonstrate the artificial respiration and the CPR Process		5	0	5
	PC24. Participate in emergency procedures		5	0	5
	PC25. Complete a written accident/incident report or dictate a report to another person, and send report to person responsible		9	5	4
	PC26. Demonstrate correct method to move injured people and others during an emergency		1	0	1
	NOS Total Marks	Total	150	45	105
ISC/N0009: Work effectively with others	PC1. Accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required	100	10	5	5
	PC2. Accurately pass on information to authorized persons who require it and within agreed timescale and confirm its receipt		10	5	5
	PC3. Provide information to others clearly, at a pace and in a manner that helps them to understand		10	0	10
	PC4. Display helpful behavior by assisting others in performing tasks in a positive manner, where required and possible		10	5	5
	PC5. Consult with and assist others to maximize effectiveness and efficiency in carrying out tasks		10	5	5



Assessment outcome (nos)	Assessment criteria	Total marks	Out of	Marks allocation	
				Theory	Skills practical
	PC6. Display appropriate communication etiquette while working		10	0	10
	PC7. Display active listening skills while interacting with others at work		10	0	10
	PC8. Use appropriate tone, pitch and language to convey politeness, assertiveness, care and professionalism		10	5	5
	PC9. Demonstrate responsible and disciplined behaviors at the workplace		15	5	10
	PC10. Escalate grievances and problems to supervisor.		5	0	5
	NOS Total Marks	Total	100	30	70
	Grand Total	1000	1000	375	625
	Percentage Weightage:			50%	50%
	Minimum Pass% to qualify (aggregate):			60%	